

POPULATION DENSITY OF ALDER FLYCATCHERS AND COMMON GOLDFINCHES IN *CRATAEGUS* HABITATS OF SOUTHEASTERN MICHIGAN

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THE dry upland nesting habitat of the Alder Flycatcher (*Empidonax traillii*) has been mentioned by several authors: Campbell, 1936:164; Wing, 1949:38; Berger and Parmelee, 1952:36; Meanley, 1952:111; King, 1955:149. Spiker (1937:48) said that the Alder Flycatcher in Iowa inhabited "dry, upland pastures, especially where there were rank growths of hazel bushes, wild crab, and hawthorn."

During the last two years in Washtenaw County, Michigan, I studied four additional areas, where hawthorns (*Crataegus* sp.) are the predominant shrubby vegetation. Each study area is sharply delineated on all sides by woods, cultivated fields, roads, or grassy pasture-land. Area *A* (Pittsfield Twp., Sect. 6) was used as a pasture through 1955, but not in 1956. Area *A* has a relatively uniform composition (*Crataegus* and various grasses and herbaceous plants), except that two ponds occupy an area of about one acre; the smaller pond dried up completely in 1956. This area is very much like that illustrated by Berger and Parmelee (1952:35). The other three areas (*B*, Pittsfield Twp., Sect. 5; *C*, Northfield Twp., Sect. 36; *D*, Superior Twp., Sect. 34) have not been grazed in recent years (10 years or longer), though all were pastured at one time, and have a lush undergrowth of herbaceous plants. These three areas also are characterized by having a few scattered trees (mostly *Acer*, *Populus*, and *Ulmus*) and some clumps and thickets of various shrubs (mostly *Cornus* and *Rubus*). Areas *B*, *C*, and *D* have some low pockets (occupying only a small part of each area), which hold standing water during the spring and early summer and which support a different flora (*Salix*, *Cephalanthus*, *Sambucus*, etc.). Of the 54 nests found in these four areas during 1956, however, all but one (in an elm sapling) were built in *Crataegus*. Table 1 presents certain information concerning Alder Flycatchers on the four areas in 1956. The population density was essentially the same in 1955, but I did not visit the areas that year until the middle of July, at which time the young had already left the nests built in early June. Because the adults were not banded, determination of the number of pairs was based primarily on the number of active nests at a given time. All population estimates, therefore, represent the minimum number of pairs in each area.

Little information is available on population density of the Alder Flycatcher. Wing (1949:40) reported an average of 9.2 breeding pairs per 100 acres of Palouse prairie in Washington; the flycatchers were "associated with the brush patches" on hillsides on a census area of 28.2 acres. King (1955) found 14 pairs per 100 acres of "alternately dense and open haw-

thorn thicket along a running stream" in southeastern Washington; over one-third of the nests found by King were built in *Rosa* sp. Meanley (1952) reported 17 pairs of Alder Flycatchers on an 18-acre tract of *Crataegus* and persimmon (*Diospyros virginiana*) in eastern Arkansas; 13 of 15 nests were located in *Crataegus*.

King (1955:154) reported the average height above ground of 42 nests as 32.4 inches (range of 16 to 66 inches) and that 83 per cent of 41 nests were between 20 and 40 inches above ground. If the one nest found 86 inches above ground (area D in Table 1) is excluded from the calculation, the average heights of ten nests in area D is 42.8 inches, thus indicating a very close average for the four areas; of the Michigan nests, 75.5 per cent were placed between 27 and 43 inches above ground. This seems to indicate, as King found in Washington, a "definite nest-height preference" by this species, but this seems to vary both geographically and ecologically. For example, Meanley reported the average height of 15 nests (13 in *Crataegus*) as 7.5 feet in Arkansas.

TABLE 1

POPULATION DENSITY AND NEST HEIGHT OF ALDER FLYCATCHERS IN *CRATAEGUS* HABITAT¹

Area	Acres	Number of Pairs	Number of Pairs per 100 Acres	Nests Found	Nest Height Minimum	Above Ground (inches) ² Average	Maximum
A	30	18	60	16	29	42.6	66
B	20	11	55	13**	27	42.4	67
C	19	11	57.9	14	32	39.0	55
D	15	11	73.3	11	29	46.7	86
Totals	84	51	60.7	54			

¹One nest 37 inches from ground in 4-foot elm; all other nests in *Crataegus*.

²To bottom of nest.

By way of comparison, it might be added that at Geddes Pond (Ann Arbor Twp., Sect. 27), a typical marshy habitat about one mile from Ann Arbor, from nine to 12 pairs (about 45 pairs per 100 acres) of Alder Flycatchers have nested every year from 1948 through 1956. The average height above ground of 45 nests in this habitat was 54.6 inches (minimum, 33; maximum, 89 inches). Of these nests, 22 were built in ninebark (*Physocarpus opulifolius*), 9 in red osier dogwood (*Cornus stolonifera*), 8 in paniced dogwood (*C. racemosa*), 5 in willow (probably *Salix niger*), and one in hawthorn. One other nest (not included in the calculation above) was placed 7 feet 10 inches above ground in a willow.

Further data are needed on clutch size of the Alder Flycatcher in order to determine more accurately the ratio of three-egg clutches to four-egg clutches. Farley (1901:347) stated that four eggs are more common in Massachusetts.

Berger and Hofslund (1950:9) found 14 (60.8 per cent) of 23 nests with four eggs in Michigan. Berger and Parmelee (1952:34) found 19 (40.4 per cent) of 47 nests with four eggs in nests visited only once. In Washington, King (1955:164) found 42.4 per cent of 33 nests with four eggs. In the present study, 51.8 per cent of 54 nests held four eggs. This percentage is probably lower than the actual ratio because some nests were destroyed before the clutch was complete and still other nests were not found until the eggs had hatched. In the latter instance, the presence of three young in a nest does not prove that the clutch consisted of three eggs, because one cannot know whether or not dead young may have been removed from the nest.

In the present study, 36 (76.6 per cent) of 47 nests were known to be successful in fledging one or more flycatchers. Of 129 eggs laid in successful nests, 115 (89.1 per cent) hatched and 114 (88.3 per cent) young left the nest. Only three (all in area B) of the 54 nests were parasitized by the Brown-headed Cowbird (*Molothrus ater*). One of the nests was destroyed; each of the other two nests fledged one Cowbird, but no flycatchers.

King (1955:164) commented that "it is evident that this species acquires some degree of proficiency in flying within a day after leaving the nest." This is certainly true, and, in fact, my experience suggests that if the young are not disturbed (e.g., by daily weighing or by banding after the young are 10 days of age or older), they are able to fly well when they leave the nest. Moreover, if the fledglings are not disturbed, they may remain in the nest tree for at least one day even after they have actually vacated the nest itself.

The breeding season of the Alder Flycatcher in southern Michigan extends from the first week of June into the third week of August. Berger and Parmelee (1952:37) commented that "it remains to be determined whether or not late spring or early fall migrants also appear on the breeding grounds during this period." Although proof is very difficult to obtain, I now feel confident that migrant birds do not appear in the *Crataegus* habitat during the period mentioned above. In 1956, Alder Flycatchers continued to sing through the first 10 days of August, when some nests still held young, but after August 16, I saw only one Alder Flycatcher (August 24) in any of the *Crataegus* nesting habitats, though I spent much time there during the following month. Furthermore, the total population on the areas rapidly decreased during the latter part of July. The number of flycatchers observed on the areas after the third week of July was directly correlated with the number of active nests and the number of nests from which young had recently fledged.

Although few people would attempt to identify the species of *Empidonax* flycatchers during migration, much could be learned about their general behavior if specimens were collected. Answers to the following questions

are still needed: Do these species migrate together in loose flocks? Do they pass through deciduous woods or through shrubby vegetation along the margins of streams and marshes? What is the time-span of the migration period?

THE COMMON GOLDFINCH

Nesting in the same habitats with the Alder Flycatcher is the Common Goldfinch (*Spinus tristis*), although the nesting season of the latter species usually begins four to six weeks later than that of the flycatchers (Berger, 1954:164). Table 2 presents information on Goldfinch nests in three of the same areas used in Table 1. All the nests included in Table 2 were built in *Crataegus*; density is based primarily on the number of simultaneously active nests, and, thus, indicates the minimum number of pairs on each area. Working with some color-banded birds, Stokes (1950:111, 116) believed that there was "a steady infiltration of birds and establishment of new territories" until the middle of August.

TABLE 2
POPULATION DENSITY AND NEST HEIGHT OF GOLDFINCHES IN *CRATAEGUS* HABITAT

Area	Year	Number of Pairs	Number of Pairs per 100 Acres	Nests Found	Nest Height Minimum	Above Ground Average	(inches) Maximum
A	1955	16	53	19 {	34	34	50.7
	1956	—	—	15 }			
B	1955	18	90	20 {	44*	38	54.4
	1956	14	70	24 }			
C	1955	39	205	66 {	120	32	48.7
	1956	26	136	54 }			

Three additional nests were built in elm saplings, 39, 43, and 54 inches above ground.

On 24 acres of "park and marshland" at Madison, Wisconsin, Stokes (1950:114-115) found breeding densities of 150 (1944), 225 (1946), and 250 (1947) pairs of goldfinches per 100 acres, and during 1947, he found 38 pairs nesting on 6.4 acres of marsh.

There is a notable difference in the distribution throughout the nesting habitat between the Alder Flycatcher and the Common Goldfinch. The Alder Flycatcher tends to be evenly spaced throughout the areas. The Goldfinch, on the other hand, seems, in general, to be semi-colonial in that the nests are situated in groups. Plots of an acre or more may have no nests, whereas another area, equal in size, may have several nests, even though the vegetation appears identical in the two areas. This grouping of nests was especially evident in area C. The average distance between seven Goldfinch nests in such a group was 23 yards; the minimum distance between two nests was 6.7 yards. There are exceptions, of course, but isolated nests are not often

found either in *Crataegus* or swampy habitats in southern Michigan. Nests along roadsides, in shade trees in towns, or along the edges of woods are more likely to be isolated from other Goldfinch nests.

The question of territorial behavior of the Goldfinch has been discussed by several authors. In his thorough study of the Goldfinch in Wisconsin, Stokes (1950:111-115) found that the "territory consists of the nest site and immediate area, but does not necessarily include food, water, or nesting material sufficient for the pair." This type of behavior is probably characteristic of the Common Goldfinch throughout most of its breeding range. Data presented by Batts (1948:52-54), as well as my own experience, suggest that the area defended may be a very small one, that immediately surrounding the nest; his data also suggest that individual Goldfinches differ considerably in their responses to the territorial instinct. Thus, I think that it has been pretty well shown by several authors that the Common Goldfinch defends its nest-site, but, at the same time, that this species tends to be semi-colonial during the nesting season. This social tendency has also been reported by Walkinshaw (1938:5), Nice (1939:123), and Nickell (1951:451).

Annual differences in nesting success are well illustrated by the data collected on Area C. In 1955, 60.6 per cent of 66 Goldfinch nests were successful in fledging one or more young. On the same area in 1956, only 33.3 per cent of 54 nests were successful; the outcome of three additional nests was in doubt. The low nesting success in 1956 is difficult to explain, because that same year at least 64.3 per cent (and possibly 71.4 per cent) of 14 Alder Flycatcher nests were successful. Stokes (1955:124-125) also found considerable annual difference in productivity during the three years of his study. One interesting fact is that, in the Ann Arbor region, 7.4 per cent of 121 nests observed in 1955 had six-egg clutches, whereas in 1956, 25 per cent of 80 nests has six-egg clutches. I found 29 six-egg clutches during 1955 and 1956. Some of these nests were destroyed or deserted and a few were visited only once, but all six eggs were known to hatch in 16 nests and 11 nests were successful in fledging six young.

LITERATURE CITED

BATTS, H. L., JR.

1948 Some observations on the nesting activities of the eastern goldfinch. *Jack-Pine Warbler*, 26:51-58.

BERGER, A. J.

1954 Association and seasonal succession in the use of nest sites. *Condor*, 56: 164-165.

BERGER, A. J., AND P. B. HOFSLUND

1950 Notes on the nesting of the alder flycatcher (*Empidonax traillii*) at Ann Arbor, Michigan. *Jack-Pine Warbler*, 28:7-11.

BERGER, A. J., AND D. F. PARMELEE

- 1952 The alder flycatcher in Washtenaw County, Michigan: breeding distribution and cowbird parasitism. *Wilson Bull.*, 64:33-38.

CAMPBELL, L. W.

- 1936 An unusual colony of alder flycatchers. *Wilson Bull.*, 48:164-168.

FARLEY, J. A.

- 1901 The alder flycatcher (*Empidonax traillii alnorum*) as a summer resident of eastern Massachusetts. *Auk*, 18:347-355.

KING, J. R.

- 1955 Notes on the life history of Traill's flycatcher (*Empidonax traillii*) in south-eastern Washington. *Auk*, 72:148-173.

MEANLEY, B.

- 1952 Notes on nesting Traill's Flycatcher in eastern Arkansas. *Wilson Bull.*, 64: 111-112.

NICE, M. M.

- 1939 "Territorial song" and non-territorial behavior of goldfinches in Ohio. *Wilson Bull.*, 51:123.

NICKELL, W. P.

- 1951 Studies on habitats, territory, and nests of the eastern goldfinch. *Auk*, 68: 447-470.

SPIKER, C. J.

- 1937 The alder flycatcher in upland situations. *Wilson Bull.*, 49:48.

STOKES, A. W.

- 1950 Breeding behavior of the goldfinch. *Wilson Bull.*, 62:107-127.

WALKINSHAW, L. H.

- 1938 Life history studies of the eastern goldfinch. *Jack-Pine Warbler*, 16:3-11, 14-15.

WING, L.

- 1949 Breeding birds of virgin Palouse prairie. *Auk*, 66:37-40.

DEPARTMENT OF ANATOMY, UNIVERSITY OF MICHIGAN MEDICAL SCHOOL, ANN ARBOR, MICHIGAN, DECEMBER 23, 1956